

The Morphology of *Cyclops* and the Relations of the Copepoda.
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THIS paper opens with a full anatomical description of *Cyclops brevicornis*, Claus, worked out in great part by the method of sections. The chief new points made out are as follows:—In the skeleton a free entosternite is demonstrated in the maxillary region, and homologized with the tendon of the adductors of the valves of the bivalve Entomostraca. A large postmaxillary apodeme in all Copepoda gives attachment on either side to the great flexors of the trunk. A spring arrangement is shown to relax the flexed male antennule used as a clasper. Pore-canals, cells, or cutaneous glands each receive a nerve-fibre at their proximal end. The hypodermal cells have a polygonal outline.

Under the mesoblastic tissue, Frič's discovery of amœboid cœlomic corpuscles is confirmed. The apparatus of deglutition is fully described, and the author has made out a pair of salivary glands in the epistoma, whose ducts join to open on the back of the labrum by a median pore. In connection with the alimentary canal, the mechanism of circulation and anal respiration is described, the efficiency of the latter being strongly maintained.

The kidney, or "shell-gland," is shown to be a simple, much-coiled tube, with chitinous lining, opening at the base of the outer maxilliped. Incidentally the presence of this organ is noted in several divisions of the marine Copepoda, and the author suggests that it is *identical* with the "antennary gland" of similar structure of the Nauplius larva, which would have shifted its aperture.

A full description of the nervous system follows. The presence of ganglion-cells in the circumœsophageal cords is noted, and used as an argument for regarding the (2nd) antennæ innervated therefrom as oral rather than postoral appendages.

The presence of corneal facets to the lateral ocelli is noted, and an attempt is made to connect what the author has described elsewhere as auditory organs with the unicellular pore-canal glands.

The views of Gruber on the reproductive organs are confirmed,

* This paper will appear in the Transactions with appropriate illustrations.

The sexual ducts are described as outgrowths from the sexual glands, themselves derived from a pair of cells of the serosa of the gut of the Nauplius as stated by Fric. About 32 spermatozoa appear to be formed from each male ovum or spermato-spore. The author is inclined to accept Gruber's view that the expulsive bodies of the spermatophore are a second form of spermatozoa.

The author then proceeds to a discussion on the position of the Copepoda. He adduces the following points:—

(a) The plasticity of the eye, derived from the triune inverted eye of the Nauplius, and the absence of paired compound eyes.

(b) The *biramous condition of the swimming-feet*, and the *characters of the appendages generally*, especially the *plasticity of the maxillæ*.

(c) The *slight development of the pleura*.

(d) The *absence of gills*, and the *functional anal respiration*.

(e) The plasticity of the fore part of the alimentary canal.

(f) The circulation and heart.

(g) The general correspondence of the form of the body with that of the Protozoëa and Zoëa larva.

By converging arguments from these points, it is shown that Copepoda would represent the most primitive Crustacea, from which the others can be derived according to the following phylogeny:—

